Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal

Section 1. General administrative information

Evaluate Status Of Pacific Lamprey In The Clearwater River Drainage, Idaho

Bonneville project number, if an ongoing project 9057

Business name of agency, institution or organization requesting funding
IDAHO DEPARTMENT OF FISH AND GAME

Business acronym (if appropriate) IDFG

Proposal contact person or principal investigator:

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Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name
UNIVERSITY OF IDAHO	COLLEGE OF FORESTRY, WILDLIFE AND RANGE	MOSCOW, ID 83843	DR. GEORGE LABAR

NPPC Program Measure Number(s) which this project addresses.
7.5 F

NMFS Biological Opinion Number(s) which this project addresses.

Other planning document references.

Idaho Department of Fish and Game Fish Management Plan, 1996-2000; Columbia Basin Fish and Wildlife Authority Draft Multi-year Implementation Plan

Subbasin.
CLEARWATER RIVER DRAINAGE, IDAHO

Short description.
The Pacific Lamprey is the only anadromous native fish species in Idaho that is not being addressed in other BPA projects. Determine the status and life history of Pacific lamprey populations in Idaho.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish		Construction		Watershed
	Resident fish		O & M		Biodiversity/genetics
	Wildlife		Production	X	Population dynamics
	Oceans/estuaries		Research		Ecosystems
	Climate	X	Monitoring/eval.		Flow/survival
	Other		Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords.

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Determination of life history	a	Determine age and length at

	characteristics		outmigration collection and measurement of individuals at traps.
		b	Determine outmigration timing by collection with rotary screen screw traps at two locations on the S.F. Clearwater River and one on the Snake River.
		c	Determine adult spawning migration timing by using radio tagging of individuals captured at Lower Granite Dam.
2	Determination of habitat requirements	a	By using radio tagging procedures spawning habitat (described by velocity, substrate, depth) will be identified.
		b	Individual juvenile habitat (described by velocity, habitat, water depth) will be identified by collection of individuals.
3	Determination of distribution of juvenile rearing and adult spawning in Clearwater River drainage	a	Collection of individual lamprey and observation of radio-tagged adults will identify distribution of lamprey within the drainage.
		b	GIS overlays will be constructed for all life history phases for the Clearwater River drainage.
4	Develop and implement strategies to minimize impacts to habitat	a	Work with land managers (USFS, BLM, etc.) to minimize habitat degradation.

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	10/1998	9/2003	30.00%
2	10/1998	9/2003	30.00%
3	10/1998	9/2003	30.00%
4	9/2003	9/2004	10.00%
			TOTAL 100.00%

Schedule constraints.
The first year's juvenile outmigrant collection could be delayed if purchase of rotary screen trap is delayed.

Completion date.
2004

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel	Fishery Tech--8mos; Bio-aide--6 mos	$22,515
Fringe benefits	@36%	$8,100
Supplies, materials, non-expendable property	Camp and field equipment, film, etc.	$5,700
Operations & maintenance	Vehicle rental, communications	$3,900
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Rotary screw trap	$16,000
PIT tags	# of tags:	
Travel		$1,200
Indirect costs	@21.3%	$9,880
Subcontracts	University of Idaho, services	$5,000
Other		
TOTAL		$72,295

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	$73,500	$77,000	$80,500	$83,000
O&M as % of total	20.00%	20.00%	25.00%	25.00%

Section 6. Abstract

The Pacific lamprey *Lampetra tridentatus* is an anadromous fish species facing the same migratory hazards as other anadromous fish in Idaho. Problems with habitat and the Snake River and Columbia River migratory corridors are unquestionably impacting Idaho's lamprey. Because Pacific lamprey are not recognized as a sport game fish in Idaho, little attention has been given to the species. While improvement in salmon and steelhead passage will also improve passage for Pacific lamprey, maintaining critical freshwater habitat for spawning and juvenile rearing is just as important for their survival. The Fish and Wildlife Plan Measure 7.5F addresses the declining status of Pacific lamprey within its natural range and the need to provide funding for projects that will support a restoration effort. This project will add to the knowledge of the lamprey's life history and habitat requirements. Data to be collected will describe both juvenile and

adult migratory behavior and timing, and describe habitat for the multi-year juvenile rearing and the adult spawning. Measuring habitat parameters such as water depth, water velocity, and substrate at collection sites will help describe preferred juvenile rearing habitat. Collection of migratory juveniles by traps will provide information on size and age of migration and the timing of migration out of Idaho. Radio tagging of adults will help provide information of upstream migration timing, spawning periodicity, spawning location and necessary spawning habitat. The information obtained will be used to identify, preserve and enhance necessary habitat in the Clearwater River drainage.

Section 7. Project description

a. Technical and/or scientific background.

The Pacific lamprey *Lampetra tridentatus* is an anadromous fish species facing the same migratory hazards as other anadromous fish species in Idaho. All native anadromous species are at risk to extinction. Coho salmon *Oncorhynchus kisutch* have officially been listed as extinct in Idaho. Sockeye salmon *Oncorhynchus nerka* are at a remnant level and listed as endangered under the federal Endangered Species Act (ESA). Fall chinook *Oncorhynchus tshawytscha* salmon throughout its natural range are listed as threatened under ESA. Spring and summer chinook salmon are listed as threatened in most of their natural range in Idaho. Wild summer steelhead trout *Oncorhynchus mykiss* are also listed as threatened in their natural range in Idaho.

Problems with habitat and the migratory corridor are unquestionably impacting Pacific lamprey as with the other anadromous fish species in Idaho. Because Pacific lamprey in Idaho is not recognized as a sport or game fish species, little attention has been given to this species (Simpson and Wallace). Basic distribution, life history and population status are urgently needed to fully understand this species and to begin intensive management before extinction occurs.

In the South Fork Clearwater River basin of north central Idaho, the Idaho Department of Fish and Game (IDFG) presently has several ongoing projects that are providing cursory data on Pacific lamprey. The BPA funded Idaho Supplementation Studies and Idaho Natural Production Monitoring and Evaluation projects have provided incidental observations and trap catches of lamprey since 1992. In addition IDFG in coordination with the Nez Perce National Forest and the U.S. Bureau of Land Management has been conducting a comprehensive bull trout *Salvelinus confluentus* inventory survey of the drainage for the past five years that has been providing limited information.

Only one concerted effort has been made in Idaho to address Pacific lamprey. Hammond (1979) studied larval biology of the Pacific lamprey of the Potlatch River, ID., a tributary of the lower Clearwater River. He also provided limited information of juvenile lamprey from three other stream systems in Idaho (Lolo Creek, Clearwater River, Salmon River). Because of the information gathered from the ongoing projects, the South Fork Clearwater River basin lends itself well to the proposed project as lamprey are

relatively abundant in the system, other ongoing IDFG projects can complement the data collection, and suitable juvenile rearing habitat as described by Hammond (1979) is abundant.

Because of land management activities in the S.F. Clearwater River drainage, Pacifc lamprey habitat is at risk. Road building, dredge mining, and livestock grazing are all activities that occur in the drainage and can cause severe impacts to aquatic habitat. This study will address habitat needs and how the land management activities can impact that habitat.

The overall goal of the project is to protect native Pacific lamprey population in the South Fork Clearwater River. This project is closely related to several planning documents. The system-wide goal in the NPPC's Fish and Wildlife Program (FWP) (NPPC 1994, amended 1995) is "a healthy columbia Basin, one that supports both human settlement and the long-term sustainability of native fish and wildlife species in native habitats….". The resident fish goal mirrors the system-wide goal by emphasizing the long-term sustainability of native species in native habitats where possible…". The goal of the CBFWA draft resident fish multi-year implementation plan is to promote the long-term viability of native species in native habitats (CBFWA 1997). Idaho Department of Fish and Game's fish management plan (IDFG 1996) states that wild native, self sustaining fish populations are management priority as is protection and restoration of habitats and water quality. One of the goals of the plan is to maintain and restore wild, native fish populations.

References:

Columbia Basin Fish and Wildlife Authority. 1997. Draft multi-year implementation plan for resident fish protection, enhancement and mitigation in the Columbia River Basin. Technical Planning Document. June 3, 1997.

Hammond, J. 1979. Larval Biology of the Pacific Lamprey, *Entosphenus tridentatus* (Gairdner), of the Potlatch River, Idaho. A M.S. thesis of the University of Idaho Graduate School, University of Idaho, Moscow, ID.

Idaho Department of Fish and Game. 1966. Fisheries management plan 1996 -2000. Boise, ID.

Northwest Power Planning Council. 1994, amended 1995. Columbia River Basin Fish and Wildlife Program. As amended in 1995. Portland, OR.

Simpson and Wallace. 1978. Fishes of Idaho. The University Press of Idaho. University of Idaho. Moscow, ID

b. Proposal objectives.

1. Determination of life history characteristics.
2. Determination of habitat requirements.
3. Determination of distribution of juvenile rearing and adult overwintering and spawning in the Clearwater River basin.

The preservation of the present levels of Pacific lamprey in Idaho is important for the continued survival of this species until the migration corridor problems associated with the dams on the lower Snake and Columbia rivers are corrected. Understanding population composition for juvenile fish and their migrational periodicity and understanding the habitat needs will provide for more intense management to perpetuate this species. Without this knowledge, preservation of critical habitat may be lost. With the many land management activities (timber harvest, road building, instream gold dredge mining) presently occurring in the South Fork Clearwater River, it is paramount that the freshwater habitat needs for this species be completely understood. The stated objectives will add to our knowledge of this species and provide the critical information necessary to minimize future degradation of lamprey habitat. The products of this project will include frequent progress reports, presentation to professional societies, and publication in professional journals.

c. Rationale and significance to Regional Programs.

The overall goal of this project mirrors the goals of the NPPC's FWP, IDFG's Fish Management Plan, and CBFWA's MYIP. The goal of all of these documents is the protection and restoration of native fishes in native habitats. This project will follow a logical sequence of steps designed to protect and recover wild native fish species. Specifically the goal of the FWP is to make a determination of the long-term sustainability of Pacific lamprey in the Columbia River

Restoration of Pacific lamprey in the Columbia River basin will provide for a healthy ecosystem through biological diversity of native fish species. The Fish and Wildlife Plan, measure 7.5F, has addressed the declining status of Pacific lamprey in the Columbia River basis and the need to provide funding for projects that will support this restoration effort.

d. Project history

No past history.

e. Methods.

Determination of life history characteristics—Juvenile Pacific lamprey will be captured by a variety of methods. Ongoing trapping projects in the South Fork Clearwater River and the mainstem Snake River will provide individual fish from which length, weight, age and transformation status can be measured. Ageing will be accomplished by length groupings as described by Hammond (1979) (minimum 30 per age class). Outmigration timing will be determined by capture dates at rotary screw traps located on Red River and another yet to be specified tributary of the South Fork Clearwater River. These traps will be operated from early spring (as soon as winter ice formation thaws) until late fall when ice formation prohibits operation.

Length at transformation from the larval stage into the macrophthalmia stage (life stage between ammocoete and young adult) will be addressed based on length of larval fish and macrophthalmia fish.

Adult Pacific lamprey will be captured at Lower Granite Dam (the last Snake River Dam prior to entering Idaho) and outfitted with radio tags beginning the second year of the project. The progress of these fish as they migrate into Idaho for spawning will be monitored with radio receivers. The radio tagged fish will be followed throughout their migration into their spawning streams. The timing and stream entered will be coordinated with an ongoing steelhead trout radio tagging study conducted by the University of Idaho.

Determination of habitat requirements—Hammond (1979) describes juvenile habitat as sandy, silt substrate. Red, American and the mainstem South Fork Clearwater rivers will be mapped as to the availability of this type of substrate. A 50 square meter of this substrate per river mile for each stream will be sampled either by electrofishing or sieving to capture individual lamprey. These sites will be determined by randomly selecting a 0.1 mile location for each river mile and then sampling the first sand,silt habitat unit upstream of the randomly selected tenth mile marker. At each individual location of capture, the substrate type will be identified, water depth measured, water velocity measured, water temperature measured, gradient measured and light intensity measured. All individual fish captured will be measured for total length and weight. All individual fish handled will be marked with elastic polymer, color coding for different streams, so that subsequent capture will identify fish as to location and date of initial capture.

Habitat usage by adult lamprey will be determined by location of these fish by radio tagging or by random encounter. The location of these fish will be described by measurements of water depth, water velocity, substrate, gradient, and light intensity. The locations of adult spawning will be described by the same parameters listed above with more intensive substrate analysis as to percentage of substrate size classes.

Determination of distribution of juvenile and adult rearing and spawning locations will be made by capture of individual fish within their natural habitat in the South Fork Clearwater River drainage. Locations of these fish by life history stage will be provided on GIS overlays for use in management planning for preservation of critical habitat in the drainage.

f. Facilities and equipment.

The project will be administered from the Idaho Fish and Game Department's (IDFG) Clearwater Region office in Lewiston, ID. IDFG has three field facilities in the South Fork Clearwater River drainage that will be utilized for housing and equipment storage during the field season, expected to be from March through October. IDFG will provide necessary field vehicles for use by the project. Laboratory, office space and necessary computers are available at the Lewiston regional office.

High cost equipment necessary for conducting the project will include the purchase of a four foot diameter rotary screw trap, a minimum of 50 radio tags for three years, and a portable radio tag receiver. Other IDFG equipment will utilized to collect additional data. These include the Idaho Supplementation Study's rotary screen screw trap operated on Red River, the Idaho's Intensive Smolt Monitoring Study's travelling screen trap located on the Snake River at Lewiston, Id., and the stationary and portable radio receivers of the University of Idaho.

g. References.

Columbia Basin Fish and Wildlife Authority. 1997. Draft multi-year implementation plan for resident fish protection, enhancement and mitigation in the Columbia River Basin. Technical Planning Document. June 3, 1997.

Hammond, J. 1979. Larval Biology of the Pacific Lamprey, *Entosphenus tridentatus* (Gairdner), of the Potlatch River, Idaho. MS Thesis. University of Idaho Graduate School. University of Idaho. Moscow, ID

Idaho Department of Fish and Game. 1996. Fisheries management plan 1996 – 2000. Boise, Idaho.

Northwest Power Planning Council. 1994, amended 1995. Columbia River Basin Fish and Wildlife Program. As amended in 1995. Portland Oregon.

Simpson J. and R.L. Wallace. 1978. Fishes of Idaho.The University Press of Idaho. Moscow, ID.

Section 8. Relationships to other projects

This investigation will be coordinated with three ongoing projects funded under FWP. The Idaho Supplementation Study, the Idaho Natural Production Monitoring and Evaluation and the Smolt Monitoring at the Head of Lower Granite Reservoir and Lower Granite Dam are projects that in the past have provided incidental data on Pacific lamprey

juveniles as they migrate downstream. These projects will continue to collect information on trapped lamprey. The Idaho Supplementation Study operates a rotary screen screw trap on Red River in the South Fork Clearwater River drainage, the Idaho Natural Production monitoring and Evaluation project conducts visual surveys (snorkeling) of many of the streams throughout the Clearwater River subbasin, and the Smolt Monitoring projects operates a travelling screen trap on the Snake River and can provide timing of out-migration for lamprey leaving the Snake and Salmon rivers in Idaho.

Section 9. Key personnel

Project Manager: Tim Cochnauer PhD

Position: Regional Fish Manager, Idaho Department of Fish and Game, Clearwater Region,

Address: Idaho Department of Fish and Game
Clearwater Region
1540 Warner
Lewiston, ID 83501

Phone: 208-799-5010
FAX: 208-7995012

Education: Doctorate in Fishery Resources, 1983, University of Idaho, Moscow, ID

MS in Zoology, 1973, University of Oklahoma, Norman, OK

BS in Zoology, 1967, University of Oklahoma, Norman, OK

Current responsibilities:

As regional fish manager, the project manager has responsibility for both anadromous and resident fish populations and fisheries within the Clearwater Region of north central Idaho. The area encompasses the entire Clearwater River drainage, the Snake River drainage up to Hells Canyon Dam, the Palouse River drainage and the Salmon River drainage (North side) from its mouth upstream to Horse Creek (rkm 300). The Clearwater Region has a staff of four fishery scientists conducting a variety of activities including data collection, creel census, management decisions, setting and implementing fishing seasons, etc. throughout the region. The staff has responsibility for the FWP funded Idaho Supplementation Study and Natural Production Monitoring and Evaluation projects within the region.

The project manager has over twenty years with the Idaho Department of Fish and Game working both in fish research and fish management. Experience include radio-tagging and monitoring a variety of fish species found in Idaho, marking and monitoring chinook salmon and steelhead trout juveniles and adult during the rearing, spawning and migratory phases of their lives, using a variety of sampling techniques for capturing different life history phases of different species of fish. These techniques include electroshocking, gill nets, angling, instream rotary screen and travelling screen traps, seining, instream weiring.

Publications:

Cochnauer, T. 1992. Idaho Rarest Fish. Idaho Wildlife. Idaho Department of Fish and Game. Boise ID

Cochnauer, T., E. Schriever, and J. Brostrom. 1993. River and Stream Investigations. F-71-R-17. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochnauer, T., E. Schriever, and J. Brostrom. 1994. River and Stream Investigations. F-71-R-18. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochnauer, T., E. Schriever, and J. Brostrom. 1995. River and Stream Investigations. F-71-R-19. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochnauer, T., E. Schriever, and J. Brostrom. 1996. River and Stream Investigations. F-71-R-20. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Principal Investigator: Fishery Technician (Graduate student) To be assigned

Education: Individual must have completed requirements for bachelor's degree and accepted as a graduate student at the University of Idaho.

Section 10. Information/technology transfer

The information collected will be presented in quarterly and annual reports to the funding agency. Overall significant finding will be submitted for publication in appropriate refereed professional journals. In addition the primary investigator will make oral presentation to fishery professional groups annually or as requested.